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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,471	03/12/2004	Hai Q. Chiang	200315915-1	7711

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EXAMINER	
NGUYEN, JOSEPH H	
ART UNIT	**PAPER NUMBER**
2815	

DATE MAILED: 05/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/799,471	CHIANG ET AL.	
	Examiner	Art Unit	
	Joseph Nguyen	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-39* is/are pending in the application.

4a) Of the above claim(s) *14-32* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-9,12,13,33,37 and 38* is/are rejected.

7)☒ Claim(s) *2-4,10,11 and 34-36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/12/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of claims 1-13 and 33-39 in the reply filed on 04/05/2005 is acknowledged.

Claim Objections

Claims 8, 13 and 39 are objected to because of the following informalities: -- are-- in line 3 should be "is". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 9, 12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kawasaki et al. (US 6,727,522).

Regarding claim 9, Kawasaki et al. discloses on figure 1A a semiconductor device, comprising:

a drain electrode 13 (col.3, line 17);

a source electrode 12 (col. 3, line 17);

means 11 (col. 3, lines 33-35) for a channel to electrically couple the drain electrode and the source electrode;

a gate electrode 14 (col.3, line 17); and

a gate dielectric 15 (col. 3, lines 17-18) positioned between the gate electrode and the channel.

Kawasaki et al. teaches in col.3, lines 33-35 the channel layer 11 is formed of a transparent conductive semiconductor (means), which is used to electrically couple the drain electrode and the source electrode.

Regarding claim 12, Kawasaki et al. discloses on figure 1A the means for a channel includes means 11 for forming an amorphous form from compounds selected from the group consisting of ZnO (col. 3, line 35). Note that ZnO is an amorphous metal oxide (see col. 6, lines 58-61, US 6,083,574, provided herein as evidence only).

Regarding claim 13, Kawasaki et al. discloses the drain electrode 13 is substantially transparent (col. 3, lines 40-42).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1, 5, 7-8, 33, 37 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasaki et al., and further in view of Ono et al. (US 2002/0101557 A1).

Regarding claim 1, Kawasaki et al. discloses on figure 1A substantially all the structure set forth in the claimed invention (see rejection of claim 9 above) except the channel including Zinc-Indium-Oxide. Kawasaki et al. teaches in col. 3, lines 33-35 the transparent conductive channel 11 is formed of ZnO. Ono et al. teaches in para [0052], lines 8-10 ZnO or Zinc-Indium-Oxide can be alternatively used to form a conductive transparent film. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kawasaki et al. by having the channel including Zinc-Indium-Oxide because they (ZnO and Zinc-Indium-Oxide) are recognized in the art as equivalents.

Regarding claim 5, Kawasaki et al. discloses the Zinc-Indium-Oxide includes an amorphous form from compounds selected from the group consisting of ZnO (col. 3, line 35).

Regarding claim 7, Kawasaki et al. discloses on figure 1A the channel 11 is being positioned between and electrically coupling the drain electrode 13 and the source electrode 12.

Regarding claim 8, Kawasaki et al. discloses the drain electrode 13 is substantially transparent (col. 3, lines 40-42).

Regarding claim 33, Kawasaki et al. discloses on figure 1A substantially all the structure of the claimed semiconductor device. Kawasaki et al. does not disclose a

plurality of pixels configured to operate collectively to display images and the channel including Zinc-Indium-Oxide. Kawasaki et al. teaches in col. 3, lines 33-35 the transparent conductive channel 11 is formed of ZnO. However, Ono et al. teaches in para [0021] and para [0022] a plurality of pixels devices configured to operate collectively to display images. Further, Ono et al. teaches in para [0052], lines 8-10 ZnO or Zinc-Indium-Oxide can be alternatively used to form a conductive transparent film. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kawasaki et al. by having a plurality of pixels configured to operate collectively to display images and the channel including Zinc-Indium-Oxide for the purpose of utilizing the improved semiconductor device in a display device.

Regarding claim 37, Kawasaki et al. discloses the Zinc-Indium-Oxide includes an amorphous form from compounds selected from the group consisting of ZnO (col. 3, line 35).

Regarding claim 39, Kawasaki et al. discloses the drain electrode 13 is substantially transparent (col. 3, lines 40-42).

Claims 6 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawasaki et al. and Ono et al., and further in view of Song (US 2004/0056987).

Regarding claims 6 and 38, Kawasaki et al. and Ono et al. together disclose substantially all the structure set forth in the claimed invention except zinc-indium-oxide including an atomic composition of zinc and indium in a ratio of zinc (x): indium (1-x),

wherein x being in the range of about 0.05 to about 0.95. However, Song teaches in para [0073], lines 1-5 zinc-indium-oxide including an atomic composition of zinc and indium in a ratio of zinc (x): indium (1-x), wherein x being in the range of about 0.05 to about 0.95. Song teaches in para [0073], lines 1-5 the ratio of Zn with respect to the sum of Zn and In is in a range of about 15-20 atomic%. It means the value of x is in a range of about 0.15 to about 0.20, which falls in the claimed range of about 0.05 to about 0.95. In view of such teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kawasaki et al. and Ono et al. by having zinc-indium-oxide including an atomic composition of zinc and indium in a ratio of zinc (x): indium (1-x), wherein x being in the range of about 0.05 to about 0.95 for the purpose of minimizing contact resistance of a conductive transparent film (para [0073), line 6, Song).

Allowable Subject Matter

Claims 2-4, 10-11 and 34-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Nguyen whose telephone number is (571) 272-1734. The examiner can normally be reached on Monday-Friday, 7:30 am- 4:30 pm. If

attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306 for regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JN
May 19, 2005

Tom Thomas

TOM THOMAS
SUPERVISORY PATENT EXAMINER